



Marc Ghanem

Postdoctoral Scholar, Anesthesiology, Perioperative and Pain Medicine

Bio

BIO

Marc graduated with a Medical Degree from the Lebanese American University (LAU), where he also completed his undergraduate studies in Biology with a focus on bioinformatics research. Throughout his medical education, his research focused on applying machine learning to clinical medicine. Marc's collaborative research efforts included work with institutions such as Mayo Clinic and Thomas Jefferson Hospital.

Currently, Marc is a postdoctoral scholar at the Aghaeepour Lab. His research interests center on using deep learning models to identify clinically relevant patterns in large medical datasets to provide personalized and predictive healthcare. His specific areas of interest include: building an intraoperative foundation model, training deep learning models for subgroup discovery, and utilizing models' patient embeddings for downstream predictions.

HONORS AND AWARDS

- Best Capstone Project, Lebanese American University (05/2019)
- Mayo Clinic Neuro-Informatics Research Collaboration Award, Mayo Clinic Neuro-Informatics Lab (07/2021)
- Excellence in Innovation Award, Lebanese American University (05/2023)
- Outstanding Researcher Award, Lebanese American University (05/2023)

STANFORD ADVISORS

- Nima Aghaeepour, Postdoctoral Faculty Sponsor

LINKS

- Twitter: <https://twitter.com/marcghanem>
- LinkedIn: <https://www.linkedin.com/in/marcghanem777/>
- ResearchGate: <https://www.researchgate.net/profile/Marc-Ghanem-2>
- Google Scholar: <https://scholar.google.com/citations?user=VyR7mXEAAAAJ&hl=enhttps://scholar.google.com/citations?user=VyR7mXEAAAAJ&hl=en>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Currently, at the Aghaeepour Lab, his research involves:

Using topic modeling techniques to analyze and interpret trends in anesthesiology research literature.[Comprehensive overview of the anesthesiology research landscape: A machine Learning Analysis of 737 NIH-funded anesthesiology primary Investigator's publication trends. Heliyon]

Building predictive machine learning models to optimize total parenteral nutrition (TPN) for neonates, aiming to improve clinical outcomes. [AI-driven Precision Total Parenteral Nutrition in Neonatal Intensive Care Units with TPN2.0. Nature Medicine]

Building a comprehensive preoperative, intraoperative, and postoperative foundation model. This model identifies patient-specific patterns to provide personalized anesthesia recommendations and continuously monitors patient states during surgery. By analyzing intraoperative data, the model can detect previously undiagnosed conditions and assess postoperative complication risks, transforming routine surgical procedures into opportunities for early diagnosis and improved patient outcomes.

Identifying differential responders and their characteristics in clinical trials.

Publications

PUBLICATIONS

- **PregMedNet: Multifaceted Maternal Medication Impacts on Neonatal Complications.** *medRxiv : the preprint server for health sciences*
Kim, Y., Marić, I., Kashiwagi, C. M., Han, L., Chung, P., Reiss, J. D., Butcher, L. D., Caoili, K. J., Berson, E., Xue, L., Espinosa, C., James, T., Shome, et al
2025
- **A machine learning approach to leveraging electronic health records for enhanced omics analysis.** *Nature machine intelligence*
Mataraso, S. J., Espinosa, C. A., Seong, D., Reincke, S. M., Berson, E., Reiss, J. D., Kim, Y., Ghanem, M., Shu, C. H., James, T., Tan, Y., Shome, S., Stelzer, et al
2025; 7 (2): 293-306
- **A machine learning approach to leveraging electronic health records for enhanced omics analysis** *NATURE MACHINE INTELLIGENCE*
Mataraso, S. J., Espinosa, C. A., Seong, D., Reincke, S., Berson, E., Reiss, J. D., Kim, Y., Ghanem, M., Shu, C., James, T., Tan, Y., Shome, S., Stelzer, et al
2025
- **Telescoping Flow Diverters for the Treatment of Brain Aneurysms: Indications and Outcome** *WORLD NEUROSURGERY*
Roy, J. M., El Naamani, K., Momin, A. A., Ghanem, M., Lan, M., Ahmed, M. T., Winiker, S., Teichner, E. M., Musmar, B., Tjoumakaris, S. I., Gooch, M. R., Ghosh, R., Zarzour, et al
2024; 191: E473-E479
- **Generating pregnant patient biological profiles by deconvoluting clinical records with electronic health record foundation models.** *Briefings in bioinformatics*
Seong, D., Mataraso, S., Espinosa, C., Berson, E., Reincke, S. M., Xue, L., Kashiwagi, C., Kim, Y., Shu, C. H., Chung, P., Ghanem, M., Xie, F., Wong, et al
2024; 25 (6)
- **Use of the Scepter Dual-Lumen Balloon Catheter for Transarterial Onyx Embolization of Cranial Dural Arteriovenous Fistulas** *WORLD NEUROSURGERY*
Kaul, A., Roy, J. M., El Naamani, K., Ahmed, M. T., Carreras, A., Mouchtouris, N., Sizdahkhani, S., Majmundar, S., Ghanem, M., Gooch, M. R., Herial, N. A., Jabbour, P., Rosenwasser, et al
2024; 189: e119-e125
- **Comprehensive overview of the anesthesiology research landscape: A machine Learning Analysis of 737 NIH-funded anesthesiology primary Investigator's publication trends.** *Heliyon*
Ghanem, M., Espinosa, C., Chung, P., Reincke, M., Harrison, N., Phongprecha, T., Shome, S., Saarunya, G., Berson, E., James, T., Xie, F., Shu, C. H., Hazra, et al
2024; 10 (7): e29050

- **The Artificial Intelligence Revolution in Stroke Care: A Decade of Scientific Evidence in Review** *WORLD NEUROSURGERY*
El Naamani, K., Musmar, B., Gupta, N., Ikhdour, O., Abdelrazeq, H., Ghanem, M., Wali, M. H., El-Hajj, J., Alhussein, A., Alhussein, R., Tjoumakaris, S. I., Gooch, M. R., Rosenwasser, et al
2024; 184: 15-22
- **LONG-TERM SAFETY AND EFFICACY OF PIPELINE EMBOLIZATION DEVICE IN ANTERIOR AND POSTERIOR CIRCULATION ANEURYSMS: A SYSTEMATIC REVIEW AND META-ANALYSIS.** *World neurosurgery*
Greco, E., Ghaith, A. K., Rios-Zermeno, J., Ghanem, M., Perez-Vega, C., Kashyap, S., Freeman, W. D., Miller, D. A., Huynh, T. J., Bydon, M., Middlebrooks, E. H., Sandhu, S. J., Tawk, et al
2024
- **Limitations in Evaluating Machine Learning Models for Imbalanced Binary Outcome Classification in Spine Surgery: A Systematic Review** *BRAIN SCIENCES*
Ghanem, M., Ghaith, A., El-Hajj, V., Bhandarkar, A., de Giorgio, A., Elmi-Terander, A., Bydon, M.
2023; 13 (12)
- **What Factors Predict the Development of Neurologic Deficits Following Resection of Intramedullary Spinal Cord Tumors: A Multi-Center Study.** *World neurosurgery*
Akinduro, O. O., Ghaith, A. K., Loizos, M., Lopez, A. O., Goyal, A., de Macedo Filho, L., Ghanem, M., Jarrah, R., Moniz Garcia, D. P., Abode-Iyamah, K., Kalani, M. A., Chen, S. G., Krauss, et al
2023
- **Immunohistochemical markers predicting recurrence following resection and radiotherapy in chordoma patients: insights from a multicenter study.** *Journal of neurosurgery*
Bon Nieves, A., Ghaith, A. K., El-Hajj, V. G., Akinduro, O. O., Ibrahim, S., Ghanem, M., Goyal, A., Otamendi-Lopez, A., Nathani, K. R., Choby, G., Laack, N. N., Link, M. J., Peris Celda, et al
2023: 1-7
- **Safety and efficacy of the pipeline embolization device for treatment of small vs. large aneurysms: a systematic review and meta-analysis.** *Neurosurgical review*
Ghaith, A. K., Greco, E., Rios-Zermeno, J., El-Hajj, V. G., Perez-Vega, C., Ghanem, M., Kashyap, S., Fox, W. C., Huynh, T. J., Sandhu, S. S., Ohlsson, M., Elmi-Terander, A., Bendok, et al
2023; 46 (1): 284
- **Surgical management of malignant melanotic nerve sheath tumors: an institutional experience and systematic review of the literature.** *Journal of neurosurgery. Spine*
Ghaith, A. K., Johnson, S. E., El-Hajj, V. G., Akinduro, O. O., Ghanem, M., De Biase, G., Michaelides, L., Bon Nieves, A., Marsh, W. R., Currier, B. L., Atkinson, J. L., Spinner, R. J., Bydon, et al
2023: 1-10
- **General Versus Nongeneral Anesthesia for Spinal Surgery: A Comparative National Analysis of Reimbursement Trends Over 10 Years.** *Neurosurgery*
Ghaith, A. K., Akinduro, O. O., El-Hajj, V. G., De Biase, G., Ghanem, M., Rajjoub, R., Faisal, U. H., Saad, H., Abdulrahim, M., Bon Nieves, A., Chen, S. G., Pirris, S. M., Bydon, et al
2023
- **The Rate and Predictors of 30-Day Readmission in Patients Treated for Unruptured Cerebral Aneurysms: A Large Single-Center Study.** *Neurosurgery*
El Naamani, K., Hunt, A., Jain, P., Lawall, C. L., Yudkoff, C. J., El Fadel, O., Ghanem, M., Mastorakos, P., Momin, A. A., Alhussein, A., Alhussein, R., Atallah, E., Abbas, et al
2023
- **Transverse Venous Stenting for the Treatment of Idiopathic Intracranial Hypertension With a Pressure Gradient of 70 mm Hg: A Technical Note and Systematic Review.** *Operative neurosurgery (Hagerstown, Md.)*
Ghanem, M., El Naamani, K., Rawad, A., Tjoumakaris, S. I., Gooch, M. R., Rosenwasser, R. H., Jabbour, P. M.
2023
- **Predictors of Transfemoral Access Site Complications in Neuroendovascular Procedures: A large Single-Center Cohort Study.** *Clinical neurology and neurosurgery*
El Naamani, K., Khanna, O., Mastorakos, P., Momin, A. A., Yudkoff, C. J., Jain, P., Hunt, A., Pedapati, V., Syal, A., Lawall, C. L., Carey, P. M., El Fadel, O., Zakar, et al
2023; 233: 107916

- **Effect of race, sex, and socioeconomic factors on overall survival following the resection of intramedullary spinal cord tumors.** *Journal of neuro-oncology*
Akinduro, O. O., Ghaith, A. K., El-Hajj, V. G., Ghanem, M., Soltan, F., Nieves, A. B., Abode-Iyamah, K., Shin, J. H., Gokaslan, Z. L., Quinones-Hinojosa, A., Bydon, M.
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- **Resuming Anticoagulants in Patients With Intracranial Hemorrhage: A Meta-Analysis and Literature Review.** *Neurosurgery*
El Naamani, K., Abbas, R., Ghanem, M., Mounzer, M., Tjoumakaris, S. I., Gooch, M. R., Rosenwasser, R. H., Jabbour, P. M.
2023
- **Deep Learning Approaches for Glioblastoma Prognosis in Resource-Limited Settings: A Study Using Basic Patient Demographic, Clinical, and Surgical Inputs.** *World neurosurgery*
Ghanem, M., Ghaith, A. K., Zamanian, C., Bon-Nieves, A., Bhandarkar, A., Bydon, M., Quiñones-Hinojosa, A.
2023; 175: e1089-e1109
- **Using machine learning to predict 30-day readmission and reoperation following resection of supratentorial high-grade gliomas: an ACS NSQIP study involving 9418 patients.** *Neurosurgical focus*
Ghaith, A. K., Ghanem, M., Zamanian, C., Bon-Nieves, A. A., Bhandarkar, A., Nathani, K., Bydon, M., Quinones-Hinojosa, A.
2023; 54 (6): E12
- **Transradial versus Transfemoral Approaches in Diagnostic and Therapeutic Neuroendovascular Interventions: A Meta-Analysis of Current Literature** *WORLD NEUROSURGERY*
Ghaith, A., El Naamani, K., Mualem, W., Ghanem, M., Rajjoub, R., Sweid, A., Yolcu, Y. U., Onyedimma, C., Tjoumakaris, S., Bydon, M., Jabbour, P. M.
2022; 164: E694-E705